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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------|------------------|
| 09/868,156 | 09/14/2001 | Karl Neumeier | SCHO0059 | 6998 |
| 22862 7590 01/26/2007 GLENN PATENT GROUP 3475 EDISON WAY, SUITE L MENLO PARK, CA 94025 | | | EXAMINER LE, THAO P | |
| | | | ART UNIT 2818 | PAPER NUMBER |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 01/26/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 09/868,156 | Applicant(s) NEUMEIER ET AL. | |
| | Examiner Thao P. Le | Art Unit 2818 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 1-22, 33-41 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>See Continuation Sheet</u> | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date
:06/12/01,07/22/02,01/13/03,02/23/05.

DETAILED ACTION

Response to Preliminary Amendment

Preliminary Amendment filed on 06/12/2001 has been entered.

Priority

This application is a 371 of PCT/EP99/07204, filed 09/29/1999, which claims priority of Germany applications 19857741.9, filed 12/15/1998, and 19927970.5, filed 06/18/1999.

Objection of specification

The specification is objected because it does not include the "cross reference of related data".

Election/Restriction

Examiner confirms that Applicants elected to prosecute Claims 23-32 and have without prejudice.

Information Disclosure Statement

Information Disclosure Statement (IDS) filed on **06/12/2001, 07/22/2002, 01/13/2003, 02/23/2005** and made of record. The references cited on the PTOL 1449 form have been considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 23-28, 31 are rejected under 35 USC 102 (e) as being anticipated by Ko et al., U.S. Patent No. 6,465,271.

Regarding claim 23, Ko discloses a method of forming a micro-electromechanical element comprising the following steps:

- a) structuring a first intermediate layer 104a (Fig. 1A-1E), which is applied to a first main surface of the first semiconductor wafer (Wafer A), so as to product a recess 106/108;
- b) connecting the first semiconductor wafer via the first intermediate layer to a second semiconductor wafer (Wafer B) in such a way that a hermetically sealed cavity is defined by the recess (Fig. 1F);
- c) thinning one of the wafers from a surface facing away from the first intermediate layer so as to produce a diaphragm-like structure 152a on top of the cavity (Fig. 1G);
- d) producing electronic components in said thinned semiconductor wafer (layer 120) wherein in step a) the intermediate layer is structured in such a way that, when the two wafers have been connected, at least two hermetically sealed cavities are defined, which are interconnected by a channel, a respective diaphragm-like structure

being arranged on top of each of the cavities after step c (Fig. Fig. 1L); and wherein the method additionally comprises the step e) of opening a defined opening through the diaphragm-like structure on top of one of the cavities (the opening formed in layer 152, Figs. 1H, 1L).

Regarding claim 24, Ko discloses wherein the main surface of the second semiconductor wafer, which is connected to the first semiconductor wafer via the intermediate layer, has applied thereto a second intermediate layer prior to the connecting step (the layer 152 is formed by boron doped into the Wafer B).

Regarding claim 25, Ko discloses the structure formed in the second intermediate layer and the recess in the first intermediate layer define the cavity (fig. 1F, the cavity is sealed between the wafer A and the layer 152).

Regarding claim 26, Ko discloses wherein a cavity with areas of variable height is produced due to the use of a plurality of intermediate layers.

Regarding claim 27, Ko discloses the first and second wafers consist of silicon.

Regarding claim 28, Ko discloses the intermediate layer consists of an oxide (layer 104a is oxide, lines 51-52, Col. 9).

Regarding claim 31, Ko discloses the opening is formed by etching (etching the diaphragm to form opening of a window, Fig. 1H; lines 59-63, col. 16).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 29, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ko et al., U.S. Patent No. 6,465,271.

Regarding claim 29, Ko discloses the use of silicon fusing bonding (SFB, line 46, Col. 16) but fails to disclose the use of vacuum. However, it would have been well known in the art that the use of SFB or vacuum to form the second wafer to the first wafer would yield a similar result of sealing the cavity.

Regarding claim 32, it is well known in the art that the channel is structured in a way that disturbing products formed during the production of the opening are prevented from passing the channel.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ko et al., U.S. Patent No. 6,465,271, in view of Zavracky et al., U.S. Patent No. 5,177,661.

Regarding claim 30, Ko fails to disclose the SOI wafer is used as the first and/or second wafer. Zavracky discloses a method of forming differential pressure sensor whereas SOI is used as a wafer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use SOI as wafer because SOI

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material used in the method of Ko will make the cleavage, separation, or thinning process easier by carrying out a blanket thermal-oxidation of the SOI wafer and etching off the oxide in the etching step. In addition, SOI wafer can provide highest gains in circuit-speed, reduced-power requirements, and the highest level of soft-error-immunity, higher-transconductance, reduced short-channel-effects.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le', with a stylized, flowing script.

Thao P. Le
Primary Examiner
Art Unit 2818
January 16, 2007.